AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (previously presented): A method for estimating a virtual patient's fasting plasma glucose (FPG) level, comprising:

determining the virtual patient's basal hepatic production (FPG_0);

determining the virtual patient's insulin level (I);

calculating the virtual patient's FPG at time t by solving an equation

$FPG(t) = FPG_0 / (I * E)$, wherein E is a value representing efficiency of insulin use; and

outputting at least one value for the virtual patient's FPG at time t to a user.

Claim 2 (previously presented): The method of claim 1, wherein E is scaled such that $E = 1$ in the absence of diabetes and $0 \leq E < 1$ in the presence of diabetes.

Claim 3 (previously presented): The method of claim 1, wherein for type 2 diabetes, an equation representing E is:

$E(DF_2) = \left(a + b / \left(1 + (DF_2 / c)^d\right)\right)^{\frac{1}{2}}$, wherein the parameters a, b, c, and d are set to fit data for a population that is represented by the virtual patient, and DF_2 is a type 2 diabetes feature that represents an incidence of type 2 diabetes for the virtual patient.

Claim 4 (currently amended): The method of claim 3, wherein

~~$DF_2(t) = \left(1 - \exp\left(-a * IGT(\xi_1) / \left(1 + \exp\left(\frac{(t-b)}{c}\right)\right)\right)\right) * RBMI(BMI) / \xi_2$~~

$$DF_2(t) = \left(1 - \exp\left(-a_1 * IGT(\xi_3) / \left(1 + \exp\left(-\frac{(t - b_1)}{c_1}\right)\right)\right)\right) * RBMI(BMI) / \xi_2$$, wherein ξ_2 and ξ_3 are random values selected from distributions for randomizing the virtual patient within the population, *IGT* is an impaired glucose tolerance value indexed by the random value ξ_3, RBMI is a relative risk associated with the virtual ~~patent's~~ patient's body mass index (BMI), and ~~ξ_1 and ξ_3 are random values selected from distributions for randomizing the virtual patient within the population~~ the parameters a_1, b_1, and c_1, are set to fit data for the population that is represented by the virtual patient.

Claim 5 (currently amended): The method of claim 4, wherein the *RBMI* is represented by:

~~$RBMI(BMI) = a + b / \left(1 + e^{-(BMI - c)/d}\right)$~~ $RBMI(BMI) = a_2 + b_2 / \left(1 + e^{-(BMI - c_2)/d_2}\right)$, and the parameters a_2, b_2, c_2, and d_2, are set to fit data for the population that is represented by the virtual patient.

Claim 6 (currently amended): The method of claim 4, wherein *IGT* is represented by:

$$IGT(\xi_3) = 2(1 - \xi_3)$$

wherein the random value ξ_3 is ~~a random value~~ designed ~~to cause~~ so that the occurrence of diabetes ~~in virtual patients~~ corresponds to ~~have the same types of interpersonal~~ variations that occur in ~~real people~~ the population that is represented by the virtual patient.

Claim 7 (previously presented): The method of claim 1, wherein said determining said virtual patient's basal hepatic production in type 2 diabetes includes solving an equation $FPG_0(t) = G(t) * H(DF_2(t))$, wherein $G(t)$ represent a basal production in people who do not have diabetes, H represents a degree of insulin resistance in a person with diabetes, and DF_2 is a type 2 diabetes feature that represents an incidence of type 2 diabetes for the virtual patient.

Claim 8 (previously presented): The method of claim 7, wherein $H\left(DF_2(t)\right) = 1/\left(MAX\left[E^2\left(DF_2(t+a)\right), b\right]\right)$, and the parameters a and b are set to fit data for a population that is represented by the virtual patient.

Claim 9 (previously presented): The method of claim 7, wherein $G(t) = \left(a + bt^{1.5} - c*t^3 + \Delta_g\right)/\left(d - e\exp\left(-DF_2(t)\xi_2\right)\right)$, wherein Δ_g represents a variance of basal hepatic production across individuals, the parameters a, b, c, d, and e are set to fit data for a population that is represented by the virtual patient, and ξ_2 is a random value selected from a distribution for randomizing the virtual patient within the population.

Claim 10 (previously presented): The method of claim l, wherein $I\left(DF_1, DF_2\right) = H\left(DF_2\right) * E\left(DF_2\right)/\left(1+\exp\left(\left(DF_1 - a\right)/b\right)\right)$, and wherein DF_1 is a type 1 diabetes feature that represents an incidence of type 1 diabetes for the virtual patient, DF_2 is a type 2 diabetes feature that represents an incidence of type 2 diabetes for the virtual patient, H represents a degree of insulin resistance in a person with diabetes, and the parameters a and b are set to fit data for a population that is represented by the virtual patient.

Claims 11-30 (cancelled).

Claim 31 (previously presented): An apparatus for estimating a virtual patient's fasting plasma glucose (FPG) level, the apparatus comprising:

means for determining the virtual patient's basal hepatic production (FPG_0);

means for determining the virtual patient's insulin level (I);

means for calculating the virtual patient's FPG at time t by solving an equation $FPG(t) = FPG_0/\left(I * E\right)$, wherein E is a value representing efficiency of insulin use; and

means for outputting at least one value for the virtual patient's FPG at time t to a user.

Claim 32 (previously presented): The apparatus of claim 31, wherein E is scaled such that $E = 1$ in the absence of diabetes and $0 \leq E < 1$ in the presence of diabetes.

Claim 33 (previously presented): The apparatus of claim 31, wherein for type 2 diabetes, an equation representing E is:

$E(DF_2) = \left(a + b/\left(1 + (DF_2/c)^d\right)\right)^{\frac{1}{2}}$, wherein the parameters a, b, c, and d are set to fit data for a population that is represented by the virtual patient, and DF_2 is a type 2 diabetes feature that represents an incidence of type 2 diabetes for the virtual patient.

Claim 34 (currently amended): The apparatus of claim 33,

~~$DF_2(t) = \left(1 - \exp\left(-a * IGT(\xi_3)/\left(1 + \exp\left(-\frac{(t-b)}{c}\right)\right)\right)\right) * RBMI(BMI)/\xi_2$~~

$DF_2(t) = \left(1 - \exp\left(-a_1 * IGT(\xi_3)/\left(1 + \exp\left(-\frac{(t-b_1)}{c_1}\right)\right)\right)\right) * RBMI(BMI)/\xi_2$, wherein ξ_2 and ξ_3 are random values selected from distributions for randomizing the virtual patient within the population, *IGT* is an impaired glucose tolerance value indexed by the random value ξ_3, RBMI is a relative risk associated with the virtual ~~patent's~~ patient's body mass index (BMI), and ~~ξ_2 and ξ_3 are random values selected from distributions for randomizing the virtual patient within the population~~ the parameters a_1, b_1, and c_1, are set to fit data for the population that is represented by the virtual patient.

Claim 35 (currently amended): The apparatus of claim 33, wherein the *RBMI* is represented by:

~~$RBMI(BMI) = a + b/\left(1 + e^{-(BMI-c)/d}\right)$~~ $RBMI(BMI) = a_2 + b_2/\left(1 + e^{-(BMI-c_2)/d_2}\right)$, and the parameters a_2, b_2, c_2, and d_2, are set to fit data for the population that is represented by the virtual patient.

Claim 36 (currently amended): The apparatus of claim 34, wherein *IGT* is represented by: $IGT(\xi_3) = 2(1-\xi_3)$,

wherein the random value ξ_3 is ~~a random value~~ designed ~~to cause~~ so that the occurrence of diabetes ~~in virtual patients~~ corresponds to ~~have the same types of interpersonal~~ variations that occur in ~~real people~~ the population that is represented by the virtual patient.

Claim 37 (previously presented): The apparatus of claim 31, wherein said means for determining said virtual patient's basal hepatic production in type 2 diabetes includes means for solving an equation $FPG_0(t) = G(t) * H(DF_2(t))$, wherein $G(t)$ represent a basal production in people who do not have diabetes, H represents a degree of insulin resistance in a person with diabetes, and DF_2 is a type 2 diabetes feature that represents an incidence of type 2 diabetes for the virtual patient.

Claim 38 (previously presented): The apparatus of claim 37,wherein $H(DF_2(t)) = 1/(MAX[E^2(DF_2(t+a)), b])$, and the parameters a and b are set to fit data for a population that is represented by the virtual patient.

Claim 39 (previously presented): The apparatus of claim 37, wherein $G(t) = (a + bt^{1.5} - c*t^3 + \Delta_g)/(d - e\exp(-DF_2(t)\xi_2))$, wherein Δ_g represents a variance of basal hepatic production across individuals, the parameters a, b, c, d, and e are set to fit data for a population that is represented by the virtual patient, and ξ_2 is a random value selected from a distribution for randomizing the virtual patient within the population.

Claim 40 (previously presented): The apparatus of claim 31, wherein $I(DF_1, DF_2) = H(DF_2) * E(DF_2)/(1+\exp((DF_1 - a)/b))$, and wherein DF_1 is a type 1 diabetes feature that represents an incidence of type 1 diabetes for the virtual patient, DF_2 is a type 2

diabetes feature that represents an incidence of type 2 diabetes for the virtual patient, H represents a degree of insulin resistance in a person with diabetes, and the parameters a and b are set to fit data for a population that is represented by the virtual patient.

Claims 41-51 (cancelled).

Claim 52 (previously presented): A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform a method for estimating a virtual patient's fasting plasma glucose (FPG) level, the method comprising:

determining the virtual patient's basal hepatic production (FPG_0);

determining the virtual patient's insulin level (I);

calculating the virtual patient's FPG at time t by solving an equation

$FPG(t) = FPG_0 / (I * E)$, wherein E is a value representing efficiency of insulin use; and

outputting at least one value for the virtual patient's FPG at time t to a user.

Claims 53-60 (cancelled).

Claim 61 (previously presented): The method of claim 1, wherein the at least one value based on the virtual patient's FPG at time t is saved in at least one file in a computer storage device.

Claim 62 (previously presented): The method of claim 3, further comprising:

setting values for the parameters a, b, c, and d by fitting the equation representing E to data for the population according to a least-squares criterion.

Claim 63 (previously presented): The apparatus of claim 31, wherein the at least one value based on the virtual patient's FPG at time t is saved to a computer-readable medium.

Claim 64 (previously presented): The apparatus of claim 33, further comprising:

means for setting values for the parameters a, b, c, and d by fitting the equation representing E to data for the population according to a least-squares criterion.

Claim 65 (previously presented): The program storage device of claim 52, wherein E is scaled such that $E = 1$ in the absence of diabetes and $0 \leq E < 1$ in the presence of diabetes.

Claim 66 (previously presented): The program storage device of claim 52, wherein for type 2 diabetes, an equation representing E is:

$E(DF_2) = \left(a + b / \left(1 + (DF_2 / c)^d\right)\right)^{\frac{1}{2}}$, wherein the parameters a, b, c, and d are set to fit data for a population that is represented by the virtual patient, and DF_2 is a type 2 diabetes feature that represents an incidence of type 2 diabetes for the virtual patient.

Claim 67 (currently amended): The program storage device of claim 66, wherein

~~$DF_2(t) = \left(1 - \exp\left(-a * IGT(\xi_3) / \left(1 + \exp\left(\frac{(t-b)}{c}\right)\right)\right)\right) * RBMI(BMI) / \xi_2$~~

$DF_2(t) = \left(1 - \exp\left(-a_1 * IGT(\xi_3) / \left(1 + \exp\left(-\frac{(t-b_1)}{c_1}\right)\right)\right)\right) * RBMI(BMI) / \xi_2$, wherein ξ_2 and ξ_3 are random values selected from distributions for randomizing the virtual patient within the population, *IGT* is an impaired glucose tolerance value indexed by the random value ξ_3, RBMI is a relative risk associated with the virtual ~~patent's~~ patient's body mass index (BMI), and ~~ξ_2 and ξ_3 are random values selected from distributions for randomizing the virtual patient within the population~~ the parameters a_1, b_1, and c_1, are set to fit data for the population that is represented by the virtual patient.

Claim 68 (currently amended): The program storage device of claim 67, wherein the *RBMI* is represented by:

~~$RBMI(BMI) = a + b/\left(1 + e^{-(BMI-c)/d}\right)$~~ $RBMI(BMI) = a_2 + b_2/\left(1 + e^{-(BMI-c_2)/d_2}\right)$, and the parameters a_2, b_2, c_2, and d_2, are set to fit data for the population that is represented by the virtual patient.

Claim 69 (currently amended): The program storage device of claim 67, wherein *IGT* is represented by:

$$IGT(\xi_3) = 2(1-\xi_3)$$

wherein the random value ξ_3 is ~~a random value~~ designed ~~to cause~~ so that the occurrence of diabetes ~~in virtual patients~~ corresponds to ~~have the same types of interpersonal~~ variations that occur in ~~real people~~ the population that is represented by the virtual patient.

Claim 70 (previously presented): The program storage device of claim 52, wherein said determining said virtual patient's basal hepatic production in type 2 diabetes includes solving an equation $FPG_0(t) = G(t) * H(DF_2(t))$, wherein *G*(t) represent a basal production in people who do not have diabetes, H represents a degree of insulin resistance in a person with diabetes, and DF_2 is a type 2 diabetes feature that represents an incidence of type 2 diabetes for the virtual patient.

Claim 71 (previously presented): The program storage device of claim 70, wherein $H(DF_2(t)) = 1/\left(MAX\left[E^2(DF_2(t+a)), b\right]\right)$, and the parameters a and b are set to fit data for a population that is represented by the virtual patient.

Claim 72 (previously presented): The program storage device of claim 70, wherein $G(t) = \left(a + bt^{1.5} - c*t^3 + \Delta_g\right)/\left(d - e\exp\left(-DF_2(t)\xi_2\right)\right)$, wherein Δ_g represents a variance of basal hepatic production across individuals, the parameters a, b, c, d, and e are set to fit data for a

population that is represented by the virtual patient, and ξ_2 is a random value selected from a distribution for randomizing the virtual patient within the population.

Claim 73 (previously presented): The program storage device of claim 52, wherein $I(DF_1, DF_2) = H(DF_2) * E(DF_2) / (1 + \exp((DF_1 - a)/b))$, and wherein DF_1 is a type 1 diabetes feature that represents an incidence of type 1 diabetes for the virtual patient, DF_2 is a type 2 diabetes feature that represents an incidence of type 2 diabetes for the virtual patient, H represents a degree of insulin resistance in a person with diabetes, and the parameters a and b are set to fit data for a population that is represented by the virtual patient.

Claim 74 (previously presented): The program storage device of claim 52, wherein the at least one value based on the virtual patient's FPG at time t is saved to a computer-readable medium.

Claim 75 (previously presented): The program storage device of claim 66, wherein the method further comprises:

setting values for the parameters a, b, c, and d by fitting the equation representing E to data for the population according to a least-squares criterion.